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CONTENTS

The Land Between	Page 49
Problems in Developing a State Program of Educational Research J. Cayce Morrison	Page 50
A Five-Year Study of the Adjustment of Rural Schools to the Needs of Youth Wayne W. Soper	Page 52
Implications of Armed Services Educational Programs for School Administration and Support M. M. Chambers	Page 54
Individual and Trait Differences in the Public School with Implications for School Organization and Curriculum Development Walter W. Cook	Page 56
Prerequisite Algebra Knowledge Possessed by Students of College Algebra Jacob S. Orleans	Page 58
Adolescent's Interpretations of Emotionally Toned Situations Alma Long	Page 60
From the Research Department	Page 72

*Looking east on the campus drive in the year's first and somewhat
tattle-tale gray, snowfall.
The original Main Building on the left and Stalker Hall dead ahead.*

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The Land Between

EDITOR'S NOTE: *The editorial in the November issue of the JOURNAL concerned the place of teaching methods in the preparation of a good teacher. It was written by an upperclass student and reflects an attitude not uncommon with students. The editorial in this issue dealing with the same problem was written by an experienced teacher. It affords a stimulating difference in point of view.*

Nothing is so difficult as moderation. Being a glutton is easy, as is thinking someone else a glutton. But one finds few people who set for the sake of the body's needs.

Not only in doing but in saying do we love extravagance. If a thing is not white, it is black; if it is not good, it is evil; and if it is not reactionary, it is radical. It is hard for us to say to ourselves, "Whoa, now! Look level and look long. Where does the truth lie? Is it here to our right? Or here to our left? Or is it sometimes on one side and sometimes on the

other?" We who are working at making teaching a profession have a peculiar obligation to be moderate without losing enthusiasm. We do not want to write of teaching "with the cold finger of a starfish," but we do want to avoid the passionate advocacy that fails to see the rainbow of colors between the black and the white.

Method has been furiously debated for a long time, longer probably, than anyone realizes. The

possession of knowledge is often taken by the academician to be the only essential. "If you know it," he says, "you can teach it." He assumes that communication is auto-

The *Teachers College Journal* seeks to present competent discussions of professional problems in education, and toward this end restricts its contributing personnel to those of training and experience in the field. The *Journal* does not engage in republication practice, in the belief that previously published material, however creditable, has already been made available to the professional public through its original publication.

Manuscripts concerned with controversial issues are welcomed, with the express understanding that all such issues are published without editorial bias or discrimination.

Articles are presented on the authority of their writers, and do not necessarily commit the *Journal* to points of view so expressed. At all times, the *Journal* reserves the right to refuse publication if in the opinion of the Editorial Board an author has violated standards of professional ethics or journalistic presentation.

matically established between two minds be they ever so unequal or incompatible. Professors mumbling over ancient notes to a roomful of inattentive minds believe that they are teaching because they know and because the knowledge released from them will flow naturally into the minds of the students. Is this *reductio ad absurdum*? I think not. It is generally agreed now that the most expert teaching is usually found in primary grades and the

most dismal in university classes. Could it be because the primary teachers have spent much time learning how to teach and how people learn and especially, children learn while the university professors have considered this as not worth learning? It is as though one believed from reading the literature of swimming in all ages he could go out and swim.

Let not scholarship be discouraged. Nothing is more refreshing than the teacher who knows more than his brightest pupil. But that the scholarship may be shared easily and fluently with the pupils let the teacher learn how to teach and let him grow steadily in the skill of teaching. Knowledge needs methods to spread its gospel, and method without knowledge would be sound and fury signifying nothing. What one needs in teaching aids depends upon what one is teaching and whom one is teaching. There is no easy answer. There is no easy truth.

J. E. GRINNELL

Problems In Developing A State Program of Educational Research

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Dr. Morrison has traveled the educational route from Principal to Superintendent to Professor to his present position. He has published many works of educational significance. His Ph.D. is from Columbia University and he holds, in addition, an LL.D. from Alfred University.

New York has had a research unit in its Education Department over a longer continuous period than any other state.

In 1920, the Commissioner with the Regents' approval created the position, Supervisor of Educational Measurements. The chief objective



of the position was defined as the "improvement of instruction through the use of standard tests"; but the work of the office encompassed many of the problems that were current

in the educational research of that period. Three years later the Bureau of Mental Hygiene was merged with the position to create the Bureau of Educational Measurements. The work of the mental hygiene staff was gradually diverted to problems of educational research, and in 1929 the title of the unit was changed to Division of Educational Research. For the next eight years, the work of the Division paralleled closely the trends in educational research throughout the country.

In the reorganization of the Education Department in 1937 the Regents created the office of Assistant Commissioner for Research and a Bureau of Statistical Services. The Division of Research and the Bureau were placed under the Assistant Commissioner who, in turn, was responsible directly to the Commissioner. The added prominence given to research in the departmental reorganization raised certain questions concerning the function and organization of research in the Department.

1. What is research?

To produce a working definition of educational research was our first problem. To write a definition acceptable to colleagues in administration was quite different from formulating a definition satisfactory for the graduate study of education.

We met the issue by proposing:

a. that the research staff would undertake only such studies as should be approved by the Commissioner in advance, and

b. that when any area of research should reach the stage of a recurring service, it should be turned over to an administrative or supervisory unit of the Department.

An illustration of a recurring service is the school building survey. In the early years such surveys were a major function of the specialist in educational measurements. Now they are a function of the School Buildings and Grounds Division.

2. Should the research functions

and, therefore, the research staff be segregated in one unit or should each major division have the staff to conduct its own research?

There is always the possibility that the research staff will come up with proposals or interpretations that run counter to the objectives of the administrative unit. If differences occur, which should prevail? At first, this problem was very real. Through experience, we have achieved a relationship, as follows:

a. Each administrative unit studies its own field of operations. It should keep abreast of the research in its field and may properly engage in such research as promotes its major objectives. It is free to call on the research staff for advice, assistance or to take over a particular study.

b. The research staff focuses its energies chiefly on problems that cut across the work of two or more administrative units. Its coordinating function looms large.

c. Whether a particular research project concerns one or more than one unit, the research staff works with the administrative staff in defining the problem, formulating the research program, interpreting the findings and stating the conclusions.

The cooperative relations of research and administration are illustrated by our study of the State's needs and resources for higher education. Through a series of conferences, a statement of the problem was formulated in terms of questions to be answered. The statement was presented to the Commissioner and then to the College Council, a group of college presidents. With the approval of the Council, the proposal went to the Regents for authorization. Agreement was reached on the kind of person desired as chief consultant and on the appointee. To illustrate more specifically the character of the cooperation, one project in the total study called for eight items of information on each student enrolled in the 93 professional schools, colleges and universities during the

autumn of 1941. The inquiry forms were checked first against the catalogues of the 93 institutions. Then the Research Associate and Director of Higher Education visited four representative colleges to talk with the officials who would provide the information, to find the "bugs" in the questionnaire, and to obtain an estimate of the cost in time and money to provide the data desired. When the forms went out and major questions were raised, the Director of Higher Education visited the institution in person to explain the problem. This procedure conserved the energy and time of the research staff, and kept the public relations in the hands of those administrative officers who, of necessity, would be responsible for carrying the conclusions of the research into effect. Proof that the cooperative procedure was good is seen in the fact that we obtained useable returns for more than 180,000 individuals, or over 99.5 per cent of all persons registered during the term under consideration.

3. *On what problems should the research staff be working?*

This may seem a trivial problem but actually it is *the* problem, an ever-recurring problem.

Early we came to certain conclusions which have served as a guide to continuing action.

a. Any research is largely futile unless there is an audience ready and waiting to use it.

b. The year by year success of the research unit is dependent upon its contribution to the solution of problems pressing upon the administration, but its long-range value is dependent upon the degree to which it anticipates the problems administration will face years hence.

Stated as a rule of procedure, the research program of the Education Department may include: (a) studies useful to the Commissioner and the Regents in the formulation of educational policies and in the appraisal of educational programs and services, (b) study of problems recommended by the administrative

and supervisory officers of the Department within their respective areas of work, (c) stimulating and helping to coordinate research in the schools and colleges of the State and through State educational organizations, and (d) conducting such other studies as may be approved by the Commissioner.

From the many requests made, from the many problems continually pressing on the administration, on which shall the research staff concentrate? This is a continuing problem. It must be faced anew with the formulation of every budget request. At least once a year, we decide which projects shall be dropped and what new ones shall be initiated. Research projects must be planned and budgeted both as to time and as to cost. With the best of planning, one-fourth or more of our energies each year go into projects that were not anticipated when the budget was prepared.

4. *What are the resources for educational research?*

Since state education departments are agencies of the state, it follows that the chief source of funds for educational research in the department comes from state appropriations. Yet, in New York, from the beginning of its research program in 1920, through 1942, with the exception of one item of \$10,000 for a specific project requested by New York City, not a single appropriation was made in the first instance to the State Education Department for research. The staff grew from the one professional worker, stenographer and clerk in 1920 to five professional workers, 14 stenographers and clerks in 1942 through action by the Commissioner approved by the Regents in transferring positions created for other purposes to research.

In 1943, the Executive Budget contained an appropriation of \$30,000 to supplement the work of the regular research staff. This was increased to \$75,000 in 1944, and to \$95,000 for the current fiscal year. In addition, from time to time, the

Commissioner obtains or reallocates other funds to the research staff for specific programs. One such allotment was \$50,000 in 1945 for studies in the development of curriculums for the proposed institutes of applied arts and sciences.

Another resource is the help obtained from staff members of administrative units. This is most frequent in studies made at the request of and in cooperation with the administrative unit; but frequently, one or more staff members are loaned to research for specified periods of time.

In a few instances, state educational associations have supplied funds in part for studies in which they have been interested. When cities or school districts request surveys for specific purposes, the surveys are made on condition that the local authority contribute a share of the cost either in personnel, funds, or both.

The essential resource of the research unit is the annual appropriation. Without it, the other resources quickly disappear.

5. *What kind of research staff is needed?*

This question is by no means academic. The research division cannot hope to have on its regular staff a specialist for every field represented in the State's far-flung educational activities. Nor is it essential or even desirable that the research staff be working continuously in all fields at all times. The needs ebb and flow.

We have retained our regular staff as of 1942-43 and have organized the new staff under the recurring lump sum appropriations along the following lines:

a. Positions at all levels employed on the same long-range basis as regular employees except that they are subject to annual appointment.

b. Specialists usually on a per diem and consultative basis. Their service may range from a few days to a few months. Occasionally one is

(Continued on Page 63)

A Five Year Study of The Adjustments of Rural Schools To The Needs of Youth

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Dr. Soper was a superintendent of schools in Nebraska for 12 years and Professor of Education, State Teacher's College, West Chester, Pa., before coming to the New York State Education Department in 1929. He has published one Book, ECONOMIC CITIZENSHIP, and a considerable number of bulletins and other research materials.

In spite of its urbanization New York State has a large rural population served by many rural schools. Studies of its rural high schools have been made from time to time. A major inquiry into the character and cost of pupil education in the State completed in 1938 called at-



tention to the relatively small proportion of pupils finishing high school and of this number the small proportion pursuing higher education. The incidence of this con-

dition was heaviest in the rural areas of the State. In an attempt to correct this condition a study was planned in 1938 which traced the records of all pupils who had been enrolled in the eighth grade in 1933 to see what had happened to them by 1938, the year of their graduation expectancy from high school. The records of some 30,000 pupils were studied, reports were published and the findings discussed at regional meetings of the district su-

perintendents during the winter of 1940. There was the usual interest, but no great enthusiasm about the reports. Then one of those incidents occurred that so often change the course of events. A district superintendent arose and lamented the fact that the study, significant as it was, actually accomplished nothing for the group of boys and girls studied. They left school, many of them before the study began, all of them by the time it was completed. Those pupils were beyond the school's direct influence. The superintendent proposed that the whole study be duplicated with pupils about ready to enter high school, each pupil to be followed for a period of five years, whether he remained in school or dropped out. The superintendent's argument was that more pupils might be encouraged to remain in school and that the schools would learn more from following the progress of potential and actual high school pupils than from tracing the records of pupils long since lost to the schools.

This idea caught fire and from that moment there was no question about projecting such a study into the future. The proposal was carried to other regional meetings and was approved by the Association of District Superintendents. It became known as THE FIVE YEAR STUDY OF THE ADJUSTMENT OF RURAL SCHOOLS TO THE NEEDS OF YOUTH. Considered from the standpoint of number of participating schools, number of

pupils studied, completeness and consistency of reporting and the number of years involved, this study surpassed anything of like nature undertaken with respect to the education of rural youth in New York State. The group studied were the eighth grade pupils in the rural schools of New York State as of the school year 1940-41. During that year 38,851 eighth grade pupils were enrolled in rural elementary and secondary schools of the State. Five hundred and twenty-four secondary schools and 1,740 elementary schools agreed to co-operate and submitted initial reports on 29,001 pupils.

The purpose of the study was three fold: (1) To encourage more youths to remain in school until graduated, (2) to assemble factual data bearing upon all phases of pupil interests, characteristics and abilities for future guidance and (3) to develop procedures and techniques useful to local schools in making adjustments to meet the needs of their high school pupils. Special consideration was given to securing complete data on pupils who left school at successive stages of the study. By this means it was hoped to learn why pupils leave and to make adjustments in the school organization and curriculum to counteract the tendency to leave. The whole study proceeded on the basis of placing on the schools the responsibility of making adjustments to meet youth's needs.

The first data collected were as of May 1, 1941 and were calculated to embrace all of the pertinent information necessary for undertaking the problems facing adolescent youth and of assisting them in their in-school and out-of-school life. It may be of interest to briefly enumerate the general characteristics of this group as it appeared in the initial stages of the study. The median age of the group was 13½ years. Three percent of them were one or more years under-age and 13 percent one or more years over-age for the eighth grade. It ap-

peared from the data that there had been considerable transfer of pupils between urban and rural schools because 33 percent of the pupils had attended schools in cities or villages.

More than 70 percent of the pupils had made their best scholastic record in English, Social Studies or Arithmetic; nearly 20 percent had made their best record in Science, Music, Fine Arts, Practical Arts or Physical Education. Strange as it may seem less than one-quarter of the group came from farm homes; about one-sixth from the managerial or professional class and the remainder from families in the skilled, unskilled and semi-skilled field.

There was some attempt to determine the relative financial ability of the homes from which these children came. About four percent came from indigent homes; about 19 percent from homes lacking in some or all of the essentials of food, clothing and shelter. Thirteen percent of these children lived in homes which employed regularly a language other than English. The school records of pupils from foreign-language homes were only slightly lower than for pupils in homes where English alone was spoken.

Nearly one-quarter of the group was reported as having some physical defect, chief of which was imperfect vision. Other physical defects were limited hearing, speech defects, cardiac deficiency, underweight, and over-weight condition and a small proportion crippled. Nearly one-quarter of this group carried out-of-school obligations which the school thought interfered with their work.

On the initial questionnaire school authorities were requested to predict the probable educational future of these children. The prediction was optimistic and the schools anticipated that 68 percent would be graduated from high schools and that not more than 7 percent would leave school during or at the close of the eighth grade.

The former estimate was far too high and the latter too low.

On October 1, 1942, when the pupils studied would normally have been enrolled in the 10th grade a follow-up report showed that 83 percent were still in school and 17 percent had already left. Two years later, October 1, 1944, 60 percent were still in school, 39 percent had left and one percent had been graduated.

In October, 1945, a few months after the group entered the senior year a final follow-up was made. Of the original group of 29,001 pupils, eighty-five percent supplied the requested information in this last follow-up. Forty-seven percent of them had been graduated from high school, 48 percent were reported to have left school before graduation and 5 percent were still in high school. It must be remembered that this was during war years when youth were leaving school in large numbers.

Perhaps the greatest interest lies in the group that left school because it is for this group that the schools need to make further adjustments. We have already spoken of the characteristics of the initial group but it may be of interest to mention some of the characteristics of the group that left school before graduation. It was discovered that pupils whose fathers were engaged in farming or manual or craft jobs were more likely to leave school than those whose fathers were in the professional, managerial, clerical and sales occupations.

The economic level of the home appears to be an important factor in determining whether a boy or a girl will finish high school. Thirty-seven percent of the group who left came from indigent or poor homes while only eighteen percent of the pupils still in school were reported in this economic level. However, it must not be presumed that economic level is a primary determining factor because it was learned that fifty-one percent of the pupils who left came from homes with

moderate economic circumstances.

It was not surprising that the majority of leaving pupils came from the group below-average scholastic work in the eighth grade. This fact would seem to imply that curriculum changes are needed to keep a larger percentage of below-average pupils in school. But, the school faces another challenge in retaining to graduation a larger percentage of pupils who do average or above-average work. This study indicated that of those leaving, 45 percent were doing average or above average work. As a group, the pupils who left school were less endowed with the qualifications that make for success, as indicated in the initial part of the study by their 8th grade teachers. On the other hand, physical handicap seemed to make little difference in a pupil's chances of staying in school. A much more weighty factor was the adjustment that the pupil had to make to school life. Twenty-three percent of those who left were reported as being poorly adjusted or unhappy in school.

In approximately one-half of the cases of leaving, the schools were aware of the pupil's intention to leave, but the schools reported that they had offered assistance to only 8 percent of the leaving pupils. Part of this apparent neglect was due to the fact that many of the pupils terminated their schooling at the end of the eighth grade in common schools which have no high school facilities and lack in addition most of the other essentials for encouraging pupils to continue into high school. This condition, however, does emphasize the lack of guidance in the small rural schools.

Why did so many of these pupils in the 8th grade in 1940-41 leave school before graduation from high school? It should be pointed out at the outset that pupils seldom leave for one particular reason; but in gathering data the respondent was requested to indicate the chief reason for leaving. Naturally dur-

(Continued on Page 65)

Implications of Armed Services Educational Programs For School Administration And Support

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Dr. Chambers is an educational authority of national reputation. His two most recent educational publications are OPINIONS ON GAINS FROM WARTIME ARMED SERVICES TRAINING and THE COLLEGES AND THE COURTS, 1941-45.

Call up some broad-scale comparisons between wartime training in the Army and Navy on the one hand, and on the other the whole American educational system, in a nation wide view. The task is big. Some sixteen million persons had



some experience of wartime services training. Roughly twice that number are enrolled in civilian schools from kindergarten through university, in any recent or current year.

Comparing Two Large Panoramas

We shall first have to make sure that we are not riveting our attention on any one small and relatively unrepresentative feature in either picture. On both sides we shall have to encompass a vast variety. Recall that some Army training went on in huge military establishments where 20,000 or 40,000 or even 90,000 trainees were concentrated, while some went on in small detachments of only a few score or a few hundred men at a civilian college or a factory. There was indi-

vidual training and crew training and unit training. There was basic training and technical training and flying training and gunnery and officer-candidate training. Beyond all that there were the manifold informal voluntary educational activities such as correspondence courses, library services, post-hostilities schools, and the enterprises first known as war orientation and later included in the general service of information and education.

The various types of duty training all had certain common characteristics. The courses were relatively short, there was great pressure for speed, and the aims were immediate and short-range, as contrasted with the objectives of civilian education. In the voluntary educational activities the primary aim was also immediate—the maintenance of morale—but the element of eventual return to civil life also entered, and to that extent there was greater likeness to civilian schooling and adult education of a general character.

Looking at the American educational system on a nationwide scale, we shall remember the city school systems, many of them relatively well-financed, well-equipped, and well-administered. See the great metropolitan high schools, with vastly diversified offerings and with generally good housing and equipment; but do not overlook the fact that a great many of the some 28,000 high schools in the nation are tiny

rural and village schools with only a handful of students, extremely limited facilities, and meagre and rigid curricula offering little choice.

Bear in mind the enormous disparities among the states and within states. Before the war the average public school operated on \$1,600 per classroom unit per year, but a few had \$6,000 or more, and some 40,000 children attended schools having less than \$100 a year for all operating expenses. There is a difference of sixty to one, incredible as it may be. Roughly speaking, South Carolina or Mississippi has nearly twice as many children of school age in proportion to total population as California or Connecticut, and only one-third of the per capita income. In West Virginia the number of school districts is the same as the number of counties, but Illinois has 10,000 school districts, hundreds of which are too small in population to provide a basis for any kind of modern school. The picture of endless diversity runs into vast detail, and an encyclopedia would be required to record it.

Some three million children attend parochial schools, and about half of all students in colleges and universities are in non-state institutions. We rightly maintain a certain freedom of choice and a diversity of control. But amid all the variations certain goals appear on the national scene clearly. The high school has become everybody's school, with eight out of ten youth of appropriate age enrolled. The junior college, to add two valuable years as the capstone of secondary education, has firm root and a great future. Every child in every state is entitled to necessary school transportation, school health, services, recreation facilities, and general and vocational education according to his ability and his choice, so far as the national resources make these things fairly attainable. In the light of this goal, far too much of the picture is blank or incomplete.

With this hastiest of preliminary

sketches, let us now look at the main characteristics of the administration and support of the wartime armed services training enterprise, and see what features must be rejected and what features may offer profitable lessons for education in America.

The Role of Central National Authority

The administration of the armed services in time of war is necessarily and essentially centralized, unitary, and monolithic. It could not be otherwise, without inviting swift disaster. Authority flows downward from the Commander-in-Chief. There is inevitably much devolution to lower commanders all down the chain to the lowest, and much policy-making is actually the product of staff officers; but there is never any question that final authority and responsibility rest at the national center.

And that authority is much more extensive and more nearly complete than any authority ever centralized at any one point in any educational system of any nation wherein democracy has a real chance to work. It includes unquestioned power to send any soldier or sailor anywhere his services are deemed necessary to the national survival, and to order him to any assignment, hazardous or otherwise. It includes a system of life-and-death punishments under the Articles of War, and it includes authority over the individual twenty-four hours a day and seven days a week.

It would be a great error not to recognize that these vast powers were exercised in World War II in the American services much more humanely and with much more respect for the dignity of the individual than ever before in any great military force. In making assignments to training and to duty, the exigencies of war and the needs of the services always came first, but this by no means excluded an unprecedented amount of careful weighing of the capacities and preferences, as well as the weak-

nesses and disabilities of each man concerned. With all its shortcomings, and of course they were many, the selection, classification, and assignment of trainees was on the whole more skillful than ever before, and to a remarkable extent served both the dire demands of national necessity and considerations of humanity and democracy.

But a nationally centralized school system, authoritarian in the last analysis, is the extreme antithesis of American educational tradition in peacetime, and it would be, I presume, anathema to all Americans. Each of the forty-eight states is traditionally a law unto itself in educational matters, and each state delegates much of educational control to local school districts and to nongovernmental institutions and associations. The school system is built from the ground upward, and the American school is to a large extent a community institution. More than that, it preserves and expands from time to time certain precious choices and freedoms for pupils, parents, and teachers as individuals.

Yet we are reminded that it is an excess of local particularism, and an excess of local decentralization of both support and control, that gives rise to many of the shortcomings and inequities in American education today when viewed on a national scale. These very characteristics, surviving from days when motor-buses were unknown, hard roads were few and rural communities were necessarily small, and the wealth of states was more largely in the form of farms and homes, now persist as barriers to educational progress long after the economic facts of life on farm and in town and city have passed into another era.

Local and State Administration

We refuse to make the long jump from the present picture to one of nationally centralized administration, and we doubt that it will ever be desirable to go all that distance. Then what can we learn from the wartime training experiences in the

swift achievement of great nationwide goals and purposes? We shall not consider sending all children and youth into a national system of training installations, where modern equipment and expert personnel could be concentrated in abundance, and where national inspection could insure a relatively high degree of uniformity, as the Army and Navy did in time of war. We do not want children uprooted from homes and regimented in cantonment centers. There is another way wide open to afford a basis from which every local school system can be a good and complete and diversified school system, yet retaining local control and with no divorcement from communities and homes.

This is the way of modernizing the local unit of school administration and support by making the school district large enough to encompass several thousand pupils—a number sufficient to provide a clientele for a central junior college, one or more high schools large enough to offer diversified curricula and abundant equipment, and various junior high schools, elementary school, and kindergarten units located within the district at points most conveniently accessible to the homes of younger children. In many parts of the country such a unit might very well approximate the size of a county. There are a few exceptions, as in New England where the county is hardly in any sense a community, and in some of the sparsely populated parts of the West where some counties are larger than the state of Rhode Island.

Such a local school unit, embracing small city and village as well as open-country, would make the county-seat high school or junior college as accessible to the farm boy or girl as to the town resident, without the necessity of crossing district lines and coping with the complexities of doubtful admission and required tuition fee. It would sweep away, with the aid of well-

(Continued on Page 66)

Individual-Trait Differences In Public Schools With Impli- cations for School Organization And Curriculum Development

WALTER W. COOK

University of Minnesota

Dr. Cook is the author of articles and monographs dealing with technical aspects of test construction, individual and trait differences, and promotion and grouping policies in the common schools.

With minor qualifications public education in the United States is committed to twelve years of schooling for all the children of all the people. In the twelfth year as well as the first the potential unskilled laborers, truck drivers and street sweepers sit beside the embryo research physicists, journalists



and surgeons. They look at the same textbooks, hear the same discussions, pursue the same educational goals and are marked on the same standards. At school age the dull and the brilliant look much alike, especially to the teacher in the elementary school who receives 40 new pupils each semester and the teacher in the high school who meets 150 pupils each day.

Of what value are educational measurements in improving the effectiveness of such schools? In answering this question it must be understood that tests are tools the value of which depends upon the educational insight and ingenuity of the user. They are potentially as harmful when used improperly as they are valuable when used prop-

erly. There is no magic in mere use. That they have been used harmfully as often as beneficially is a debatable proposition.

When a new instrument becomes available in any field of endeavor it is natural that its usefulness be estimated in terms of its power to facilitate the achievement of the then accepted objectives within the prevailing forms of organization and procedure. The fact that the results of the use of the instrument constantly point to the need for revising objectives and changing organization and procedure may go unheeded for sometime. Witness the use of the tank and aeroplane in World War I, their influence on military organization, strategy and tactics, as compared with World War II. School men are probably slower in adjusting to the use of a new instrument than the military.

Intelligence and general achievement tests continue to be used to classify pupils into so-called homogeneous or ability groups on the assumption that these groups may be subjected to uniform instructional procedures in the various fields of learning. Test scores are still used to determine whether a pupil will be accelerated, promoted or failed, on the assumption that grade levels indicate definite stages of educational achievement. Test norms continue to be the basis for so-called standards of achievement and for marking pupils, on the assumption that competition among unequals is a powerful incentive to

learning effort. Measurement is still used to determine the extent to which pupils have learned factual material and memorized pat answers to pat questions on the assumption that such "knowledge is power".

If educational measurement is to achieve its maximum value in the improvement of the educational process the results of measurement must be considered basic data in a reexamination of the prevailing school organization, its objectives, procedures and basic assumptions. Primary data for such a reexamination are those having to do with the nature and extent of individual and trait differences.

Range of Intelligence by Age and Grade Levels

The most dependable data on the range of intelligence by age and grade levels is furnished by Terman and Merrill,¹ and McNemar² in connection with the 1937 revision of the Stanford-Binet Scale. The range of mental development with which the teachers of typical grade groups must cope is 5 years at the primary level, 6 years at the intermediate level and more than 8 years at the junior and senior high school level. When the mental age range by chronological age groups is considered we find it not substantially greater than for grade groups. Thus it is seen that promotion practices, which are sufficiently drastic to produce a chronological age range of 6 years in the typical grade group, do not materially decrease the wide variation in mental level within a grade from that which would result if promotion were made entirely on the basis of age. The typical sixth grade teacher must cope with mental ages from

¹Lewis M. Terman and Maud A. Merrill: *Measuring Intelligence*, Houghton Mifflin Co., Boston, 1937. (pages 12-21).

²Quinn McNemar: *The Revision of the Stanford — Binet Scale*, Houghton Mifflin Co., Boston, 1942. (Chapter III).

8 to 16 years regardless of promotion policies.

Range of Educational Achievement by Age and Grade Levels.

Studies of the range of educational achievement by age and grade levels by Cornell³, Cook⁴ and Lindquist⁵ indicate substantially the same ranges as reported above for intelligence. If we use reading age as an example, Lindquist reports that 16 per cent of sixth graders exceed the eighth grade median and approximately 15 per cent of eighth graders fall below the sixth grade median, i.e. the distance between the medians of these two grades is one standard deviation in either direction. Hence the total range of either group is six times the difference between the sixth and eighth grade means. Allowing for the fact that distances between grade means increase as the lower grades are approached, a typical sixth grade class contains at least one pupil with second or third grade reading ability and another with eleventh or twelfth grade reading ability. This is true of achievement in the other basic skills and in content areas. After comparing the variability of age and grade groups in educational achievement Cornell states that, for practical purposes of classification, we could deal with an age

³Ethel L. Cornell. *The Variability of Children of Different Ages and Its Relation to School Classification and Grouping*. University of the State of New York, Bulletin 1101, Educational Research Studies, 1937, No. 1. Page 98.

⁴Walter W. Cook, *Grouping and Promotion in the Elementary School*, series on the Individualization of Instruction, Number Two, University of Minnesota, Minneapolis, 1941 (Pages 26-30).

⁵E. F. Lindquist and others, *Manual for Administration and Interpretation of the 1939 Iowa Every-Pupil Tests of Basic Skills*, Iowa City: Bureau of Educational Research and Service, University of Iowa, 1938, page 23.

group without any more difficulty due to diversity than we find in a grade group.

Variability of Intelligence and Achievement in College and High School

The most comprehensive and detailed study of the intelligence and achievement of high school and college students is the Pennsylvania study by Learned and Wood⁶. With reference to intelligence they found that the total range of scores at both college sophomore and college senior levels is almost as great as that of high school seniors, and that in almost every curriculum group in every college there were students below the 25th percentile of high school seniors.

On the General Culture Battery of achievement tests it was found that 10 per cent of college seniors were below the median score of high school seniors, and that 10 per cent of high school seniors were above the median score of college seniors.

In one representative college it was found that if the graduating class had been selected from the entire student body on the basis of achievement test scores, instead of from the senior class on the basis of time spent and credits earned, only 28 per cent of the seniors would have graduated. The remainder of the graduates would have been made up of 21 per cent of the juniors, 19 per cent of the sophomores and 15 per cent of the freshmen. The mean score of the graduating class selected on the basis of achievement would have been one standard deviation above the average of the class that actually graduated, and its mean age would have been two years younger.

Emphasis has been placed on the variability of age and grade groups in intelligence and achievement be-

⁶William S. Learned and Ben D. Wood, *The Student and His Knowledge*, The Carnegie Foundation for the Advancement of Teaching, Bulletin No. 29, New York, 1938.

cause in spite of the overwhelming evidence available, educational thinking, has in the main, ignored it. The basic idea persists, that school status as determined by time spent, exercises performed, and courses passed is closely related to intellectual skills, understandings and usable information, that grade levels signify rather definite stages of achievement. As corollaries of this idea are the assumptions that a course of study for a grade is the scheduled academic requirement to be administered uniformly to all pupils in a grade, that all pupils in a grade should be capable of coping successfully with the work outlined for that grade, that a pupil should not be promoted to a grade until he is able to do the work of that grade, that when individual differences are provided for all pupils are brought up to standard, that maintaining a passing mark results in homogeneous groups, that satisfactory instruction for a class can be based on a uniform textbook, and that when relative homogeneity of a class does not prevail it is the result of poor teaching on lax standards.

Despite the fact that in the elementary school the range of intelligence and achievement in a grade is from five to eight or more years each teacher is assumed to be a specialist at a given grade level, with special knowledge and techniques appropriate to that level. Thirty-five to fifty new pupils are assigned to her each year. She need not know the pupils, their aptitudes, abilities, interests and peculiarities. She need know only the subject matter, the techniques and the content of the uniform textbooks.

At the high school level where variability reaches its maximum the teacher really becomes a departmentalized specialist in subject matter. Here the teacher with the special knowledge, techniques, and textbooks faces from 150 to 200 pupils each day. The struggle is no longer to know abilities, aptitudes,

(Continued on Page 67)

Prerequisite Algebra Knowledge Possessed by Students of College Algebra

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Other publications by Dr. Orleans dealing with mathematics in modern education are: "Measurement in Education," 1937, "Commercial Arithmetic Knowledge of Students in a Collective School of Business," 1941, and "An Analysis of the Arithmetic Knowledge of High School Pupils," 1943.

At the outset of the war the City College of New York instituted the practice of requiring that all students in the college take a course in college algebra, unless they had already had the equivalent of it. Although the requirement was aimed at the male students, in view of the demand for knowledge of mathematics by the armed forces, as a matter of administrative convenience it was applied to the girls as well. It was soon apparent that some of the students lacked the background needed for adequate learning of the course. In order to make more certain that students were adequately prepared, the first four weeks of the fifteen-week semester was devoted to a review of elementary and intermediate algebra.

At the end of this four-week period during the spring semester of 1944, a test covering 20 simple aspects of elementary algebra was administered to the 713 students enrolled in the course at that time. An analysis of the data on this test reveals a number of interesting things and provides rather cogent, if only partial, answers to several important questions. Just how

much do students get out of the study of algebra? What real learning has taken place? What has the learning consisted of? What are the implications for the educational program at the high school level, insofar as mathematics is concerned?

Before presenting the evidence and discussing the answers to these questions a few comments are in place concerning the content of the test and the quality of the students for whom the data were obtained. The test, as already stated, consisted of 20 simple tasks for which 50 minutes were allowed. Very few students needed to use all the time, and hardly any failed to finish the test. The following are illustrations of the tasks, including some of the easiest and the most difficult as well as of those of average difficulty:

factoring a trinomial: $x^2 - 5x - 14$

multiplying two binomials:

$(a-bj)(c+dj)$

squaring a binomial consisting of

two radicals: $(\sqrt{x-2} - \sqrt{x})^2$

finding a value by rationalizing one denominator:

If $\frac{1}{\sqrt{3}} = 1.732$, find the value of $\frac{6}{\sqrt{3}}$

evaluating a function of x for a given value of x : evaluate $3x^3 - x - 7$ for $x=12$

writing as two terms a fraction with binominal numerator:

write as the sum of two terms $\frac{3x^2 + 2n}{n}$

simplifying the product of two nonomials with exponents:

$$\frac{(2x^3)(3_2)4}{2x}$$

These tasks represent the range of content and difficulty of the 20 tasks in the test. Now what of the students? Admission to the City College of New York is limited to students who enter with a high school average of at least 82%, except for a few whose high school average is at least 75% and who pass a special entrance examination.* The freshman class at the college represents not more than the top fourth of the graduates of the New York City high schools. In the Thurstone Psychological Examination, the average score of the freshman class of the College is generally higher than the 75 percentile of the norms. Of the 713 students taking college algebra in the spring of 1944, all but 28 had had at least three years of mathematics prior to their enrollment in the college algebra course, and well over half had had at least three and a half years of mathematics. Every one of them had had both elementary and intermediate algebra, and 71 were repeating the course in college algebra.

In other words the mathematics achievement of this group should be superior both in comparison with that of high school students in general, and also in comparison with that of other college algebra groups. As one interprets the best results for the group described one might ask, if one dared, "What would the results be for the entire population of high school students who have completed the study of intermediate algebra?"

Some of the 713 students had not had any work in algebra for a year or more. But in view of the total amount of mathematics the entire group had had, the general level of ability of the group, and the fact

* As a result of post-war conditions, the entrance standards have been raised to an even higher level.

that they had experienced four weeks of review of elementary and intermediate algebra, the effects of forgetting should be seriously discounted. Counting the time spent in class and in homework, the amount spent in studying algebra prior to the college algebra course may well have averaged close to 500 hours per student. Everything considered, and particularly the elementary nature of the tasks in the test, would it be too much to expect that the median achievement of this group should be represented by virtually a perfect score?

Anyone who is acquainted with findings in studies of this sort would, despite all the conditions described, expect relatively meagre results. If a "passing mark" of 70 percent had been set on the test, surely a low standard under the circumstances, three-fifths of the students would have failed. The median score was barely 60 percent of the total possible score. One sixth of the students were unable to multiply correctly two binomials or to simplify the expression $(-3x^2)^3$. Half were unable to write as two terms a fraction with a binomial numerator, or to write the reciprocal of the expression $4 - \frac{5}{x}$.

or to simplify $(2x^3)(32)^4$, or to

evaluate the expression $3x^2 - x + \frac{1}{2}$ FOR $X = \frac{1}{2}$, or to evaluate the expression $c - d^2$ for $a = 2$, $c = 3$, and $\frac{1}{1-c}$

$d = \frac{1}{2}$. Only one fifth of the students were able to write correctly the square of the binomial

$$\frac{\sqrt{X-2} - \sqrt{x}}{x}$$

Such evidence is merely an addition to other evidence already available that discloses a pitifully meagre residuum of learning even in the case of superior students. More important that the condition itself are the reasons for it. Why is it that superior students learn so little algebra and know so little after having spent so many hours in the study of the subject, as well

as several hundred more hours in studying other branches of mathematics, besides using algebra in other subjects like geometry, trigonometry, physics, and chemistry? The reasons for this case of educational bankruptcy can be gleaned at least by implication, from a study of the nature of the errors made by the students—the kind of errors, how and why they made them. One might agree that the errors were caused by carelessness. If that were the case, one can only conclude that the students learned carelessness rather than algebra.

In order to get at the root of the situation, the papers of 287 students were chosen, and a tabulation of the wrong answers made for each of the 20 tasks in the test for these 287 papers. The papers were then inspected to determine how at least the frequently occurring wrong answers were reached by the students.

The analysis produces the following implications: The initial learning of the students was largely a meaningless, purposeless, rote activity. The students learned various series of steps which, once excessive practice has ceased, they apply indiscriminately, without rhyme or reason. "The nature of the errors they make indicates a lack of comprehension of the tasks or of the meanings of the elements that comprise them, or of the processes to be performed. These students 'passed' their previous mathematics courses, and their marks, by and large, were rather high. Otherwise they would not have been admitted to the college. The month's review should have recalled all the meaning and skill they have forgotten. But meaning cannot be recalled if it wasn't there in the first place. And skill cannot be revived if it is not related to meaning, except with excessive and continuous repetition."

The student learns various concepts, procedures, and rules from his algebra textbook. But the student also creates his own algebraic concepts, procedures, and rules.

The analysis of student errors makes this phenomenon only too clear. The following are some of the items that may be characterized as "a student's algebra"—by which is meant the rules that students make up themselves in performing algebraic tasks, and that illustrates the fact that the tasks they perform and the procedures they employ are entirely devoid of significance.

- (1) Since fractions are things to be avoided, and a fraction exists only when there is a denominator, don't write the denominator. The justification for this practice arises from the fact that when there are fractions in an equation you can make them disappear by multiplying both sides of the equation by the denominators of the fractions. That this reasoning is not far fetched is shown by such answers as $d=6$ to a task involving fractions but no equation. (e.g. Add $\frac{d-10}{4} + 1$)

- (2) If any number appears in both numerator and denominator of a fraction cross them out. You are justified in doing so by a process named cancellation. Thus in an expression like $\frac{3a+b^2}{c+3}$ the

cancellation process would mean crossing out the 3's. An interesting result of this technique is the case of the "hanging exponent". In the expression $\frac{2a-b}{b^3}$ students

have been known to cancel the b's although this leaves the exponent 3 in the denominator without a base.

- (3) When you have to square a binomial you square the two terms, for example $(2c+3d)^2$ means $4c^2 + 9d^2$. The one exception to this rule is that $(a+b)^2 = a^2 +$

(Continued on Page 70)

Adolescent's Interpretations of Emotionally Toned Situations

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The data herein presented are part of an account of a study in progress. The study was initiated to gain a reasonably clear understanding of how behavior emanating from complex but nevertheless common experiences of every-day living appears to and may be interpreted by adolescents. Within these common experiences personalities are formed, attitudes crys-



tallized and major structures of our social heritage modified. The present era, with its turmoil, striking opportunity for and need of superior leadership, offers a unique

challenge to those whose responsibility for education of the young includes thought for the role of personal relationships. How does a child's social environment appear to him, and how extensive are his tools for modifying, controlling or understanding those subtle forces and numerous experiences that could leave a welter of feeling where only a monetary dissatisfaction would really be justified?

What may we know of a child's experience and the pattern of feeling responses that such experiences have left deeply etched on his personality, and by what approach may we gain some inkling of the extent and direction of those unhappy moments which started off or re-enforced some undesirable attitude response? What is the role of "intellect" in a "feeling" episode?

What forces transform a difficult situation into a wholesome challenge to practice better and happier relationships with those who are our social environment? What is the major content of youths' views upon ordinary day-by-day contacts with personalities inherent in their family form or in those individuals whom he is privileged to choose for companionship? When and how do they learn the fine art of give-and-take without too many reservations or oft-repeated acrimony? How may we measure and what tools may be devised for helping adults and the youths themselves toward proper concern about our foibles, useless and costly social habits, or those deeper lying symptoms of personality disintegration? The projective technique was chosen for the study because of its unique adaptability to expressions of feeling quality.

One able critic of education measurement has indicated that the framework of personality, and the way in which the personality meets situations, manifest themselves in ideational content and reflections. This content may be revealed in part by the subject's reflections about his own experiences and his own place in his immediate world.¹ If this is true, it is further probable that the ordinary experiences of everyday living provide endless opportunities for the accumulation of memory traces that may be re-instated and re-enforced in a pattern

¹Rapaport, David, *Diagnostic Testing*, Vol. II, Ch. IV. 1945-6. The Yearbook Publishers, Chicago, Ill.

of emotionalized reactions, any of them with strength and clarity enough to be expressed in current behavior. Stimuli that are vague enough to avoid a stereotyped response may serve to touch off latent feelings, when repeated often, of in several ways, give well defined clues to factors of personality structures or to the types of experience that have left indelible marks, pleasant or otherwise, on the tenuous web of feeling. Because the projective technique enables the subject to attach undesirable personality traits to the hypothetical person of whom he may be talking, without incriminating himself, or to attach to himself virtues he may credit to others, it offers subtle clues to what may have been going on in the subject's mind, what he may have desired for himself, what may have caused him worry or disappointment. No one or two comments reveal the real person. However, repeated motifs or characteristic blendings or nuances of emotional tone seem to "stack up" into a reasonably sure indicator of important aspects of the underlying personality. Infinite care and reserved judgment are required, lest some remark that, for instance, might seem trivial, romantic, morbid, gay, facetious were to stem from quite opposite feeling tone. As must be true in dealing with any highly complex organism, many seemingly good evidences must be weighed and re-weighed in terms of all we may know about it before passing judgment.

There have been many evidences of the ability of youths to assume grave responsibility and to adjust themselves to difficult environmental conditions. We also meet others who, put to a test, fail to develop these desirable personality traits. Studies have been given unmistakable evidence that many youths recognize the need for training in the art of living comfortably with those who are and preface must be their lifelong associates. They have also recognized their need for practice in assuming and carrying re-

sponsibility. When the home and community fail to provide the opportunities needed for suitable training, a new responsibility devolves upon the school. This study is directed toward finding ways to provide the kind of information required to help teachers and counsellors guide youths toward a better understanding of themselves, of the underlying psychological needs of others and the cultivation of wholesome attitudes toward people. Somehow, in the zeal for progress, we have lost many of those priceless opportunities for the young to learn the finer values of life as they shared work, play, spiritual refreshment alongside the patriarch, great mother or philosopher of the small community. Much that has replaced the old pattern is fine and good. However, the ever-lasting ratio of broken homes and disoriented families calls attention to the crying need for clearer insight into the emotional needs of individuals and a greatly enriched understanding of the ordinary person who is trying to find his way through a maze of new and perplexing experiences. To assure a more general preparation of the individual for solving his own emotional problems, we must help teachers toward a deep understanding of ordinary social complexities of individual differences in reaction and to quickly recognize the presence of psychological problems for which expert help would be needed. Further, we must be able to lead more children to see and evaluate their own motives, to consider their own wants and satisfactions in relation to those of the people who form their social environment and to others outside that close bond.

A study that was preliminary to the one now being reported explored some of the abilities of children to visualize some difficulties which other children were having, and to recognize good ways to help the children described. Surprising discernment was found among many classes of adolescents who contri-

buted to that study. The many recommendations of wholesome procedures to be adopted offer proof at their interest in human behavior and of their readiness to go much farther in the consideration of emotional behavior and its suitable control than adolescent splurges of immature behavior might lead us to believe. At the same time, there was a very definite tapering-off of ability to cope with, or for that matter, to be interested in elaborate psychological concepts if they were abstruse or highly involved. Within the limits of recognized social needs of youth, and the beginnings of deeper insight associated with marriage and family responsibilities, a rich field for learning is open for culture.

Materials of the Study

An initial set of 40 situations was formulated from teachers' reports of problems which had been brought to them for counsel by high school pupils during one specific year. These were also problems with which the teachers felt themselves inadequate to deal to be helpful to the pupils. The problems were studied to find ways to help both teachers and pupils to help themselves. For this, some knowledge of adolescent views on ordinary life experiences, the extent of latent understanding of psychological concepts and some measure of inherent attitudes about emotional aspects of ordinary happenings was deemed necessary.

Reactions to 12-15 illustrations of ordinary situations and also extensive information about the child (intelligence, personality, family background, etc.) were secured in completed form from approximately 600 children in grades seven to twelve in four representative high schools of the state. There were a few more boys than girls in the class groups. Not all grade groups were of equal size. However, each segregated age or sex group provides a sufficient number to reveal wide differences in reaction to the situations presented. The initial

forty pictures were rotated among all grade levels to secure a maximum number of age and environmental factors to consider in the evaluation of the materials assembled.

Obviously, not only the situations selected for presentation, but also inherent qualities in the pictures themselves would stimulate varying types of response. To assure every child "success" in the job of analyzing the situations, a number of obvious and simple activities were included. All those which resulted in great similarity in response were removed from the assortment to be subjected to detailed analysis. Twenty-nine pictures survived this preliminary culling. Among them several more appear to be useful for one purpose or another, but not particularly valuable stimulus for responses that receive uniform scores or ratings from the judges. These uncertain responses offer many suggestions about ideas or manner of expression that require most thoughtful consideration if they are to be used in either written or spoken language for estimates of personality.

Some 1500 individual statements about the pictured situations have been classified and ranked by highly trained judges, as one means of determining the extent of ability of adolescents to comprehend many psychological concepts involved in the social situations presented and also to find some measure of the extent of maladjustment probably existing in children whose interpretations are predominantly unhappy, critical, rebellious and the like.

Some Findings

Within the distributions of scores on personality test items and general classification of responses to pictures there are some significant differences between the sexes and also between age groups. In the main, the histories of these groups as they are found in this study, appear to be far more similar than unlike. In other words, many basic, underlying social character-

istics that affect each and all, regardless of small differences in age, in sex, residence, intellect, appear to recur over and over in groups of responses. Attitudes seem to spread throughout the groups with great regularity, although there are some striking examples of insight and maturity among the young members of the group (Grades 7-8) and corresponding immaturity among some members of the eldest (Grades 11-12). Final evaluation of the opinions of the selected judges may result in some discriminating characteristics of mature and of maladjusted components of personality expressed in child interpretations of ordinary life situations. Striking similarities in frequencies that occurred in two carefully matched groups are more obvious than the differences. The low frequencies of some types of responses in these matched pairs are similar to low frequencies in the general distributions among the large group from which they came. In other words, the school populations represented in the study contain some members who have a generous sprinkling of "to be expected" traits, both good and not entirely desirable.

What values may be attached to statements made by the pupils? What content or quality in response manifests itself to suggest insight and maturity on the part of the writer? What may suggest emotional disturbance or the resurgence of unhappy experiences? Unselected comments about an illustration showing a mother and daughter by girls in one class include: Sickness and sorrow, in which comfort is being given; Mother advising girl, but giving her a chance to "Do as she thinks best;" Bad report card; Mother trying to make daughter understand problems confronting girls; Girl being expelled from school; Girl feeling sorry but also justified in her behavior; Girl feeling very regretful; Girl knowing the better way to do but all the time wanting to do the other way; Mother scolding, girl not caring.

Also, within that class group was one who commented thus, "The girl has just written her boy friend and her mother read it. The girl wishes her mother would quit preaching. The mother says to never write that again." This particular comment happened to fall among those submitted to the judges, who independently scored it high among responses to that picture as suggesting maladjustment or unhappy experiences. Two superior responses, suggesting insight and good adjustment may be used for comparison. In one, the girl seems to have received bad news and the mother is trying to make the girl understand that one must face bad news just as one faces good things. The other refers to a request for help in writing a letter, cheerful acceptance of the suggestions made. This latter is the response of a 13 year old girl who came from a disadvantaged home, who received high scores on the personality tests. The girl first mentioned in this paragraph came from a superior home, but was also found to have expressed a disproportionate amount of anxiety in the personality test. The second mentioned above (The bad news) came from a fourteen year old girl of high intellectual ability, but who came from a very poor home. Various combinations of quality of home environment, intellect and of personality traits often result in expression of ideas and feelings that have been recognized by the judges who, except for age, grade and sex, had no information about the child who made the comment. (*Boy* responses to this picture often feature consulting about a problem, mother giving a girl needed advice, and on the maladjusted side, include a "bawling out" and complete rejection of a parent by a child.)

Qualities in parent-child relationships are often expressed in response to a picture of a man and boy at a workshop bench. A boy of seventeen, coming from a poor home and having a poor personality test

score commented thus: I think it's a good idea for fathers to be interested in their son's hobbies. The man is saying "This will help you in later life. Do it carefully," and the boy, "Thanks, Dad, I'm glad you're interested." Considered alone, this comment received a high score for insight and understanding or good adjustment. One may well ponder on what the boy might have endured and also how very great are his potential abilities for good social adjustment.

Another boy of the same age, also from a poor home, but having a good personality score commented: "The boy is building a model airplane and the man is telling him he is doing a swell job." If I were in the boy's place, I'd thank him and ask him what to do if I were puzzled over it." The high score for maladjustment was given to the comment of a 14 year old boy, saying "Son, you must get your lessons. The boy is saying he hates school." This boy's scores are all at average. A seventeen year old girl commented, "The man is annoying him by watching every move and saying 'Why don't you do it this way?' If I were the boy, I would tell him not to watch me because it makes me so nervous I can't do anything." This, from a girl with poor scores on everything but intelligence. A juvenile response was judged to be, "He is telling the boy how to do it. The boy says, 'Leave me alone, I want to do it by myself'."

Important facets of social relationships are touched upon in response to a picture of a woman and a girl standing within a room and a boy outside the open door on the porch. Very high scores on insight, understanding, adjustment were given the following comment: "The boy is taking a girl out for the first time. The woman is telling the girl to not stay out too late and to be good to the boy. The boy would be thinking about the way to show the girl the best time possible." This boy's scores were all at average. Another

boy's comment: "A boy friend is coming to see the girl. The boy wonders what the girl and her mother think of him. He wants the girl and her mother both to like him." This boy has low intelligence and a very high personality ranking. At age seventeen, he has learned some valuable rules for successful living.

On the contrary side, equally high scores representing maladjustment were given the following comments from two other boys: "Something went wrong in the family, a boy and girl trouble. The boy is wishing he was a grown man so he could get away from home if it is that. Feeling sorrow for the wrong he did." And, "The boy has disgraced himself and is going in to face his family. The woman thinks, why doesn't he face it. The boy says, 'I can't go in and meet them face to face.'" The first of these two comes from a poor home, has a good personality score. The latter is the comment of a highly intelligent boy who has a reasonably good personality score, and who comes from an "Average" home. Both these comments, taken individually and separately, probably give an exaggerated measure of the individuals. They are of the type which one learns to discount, when seen in more complete record, as part of the rightful "romancing" or playful banter of youth. Alert to it, one reserves judgment until many other expressions have been studied. Therefore, the need to secure many different kinds of record before an estimate of so complex an entity as "personality."

Summary

Experience has shown that values which are very different from, and possibly more important than those defined by intelligence, skills and other "doing" activities, may be derived from indications of subtle, underlying attitudes, motives, drives, pattern of interpretation of one's environment. To the extent that the feeling content hinders or facilitates the full use of one's other

abilities, it remains among the most important of our concerns for living. It has been found that persons can be trained to detect the accumulation of attitudes toward or against a given object by means far less obvious than the direct question. One of these is by way of a large number of comments about pivotal experiences applied to a hypothetical personage. The study now in progress, and from which a few partial findings have been extracted for this report, begins to show some substantial degrees of relationship between accumulated responses and personal factors.

Preliminary tests of the method of data analysis have indicated a high degree of similarity between the over-all neurotic score index of the large group and the proportion of picture responses scored as suggesting neurotic tendencies. Similarly, high relationships seem to occur between scores assigned to the child's interpretation scores and quality of home and with intelligence follow in descending order.

There is ample evidence of the interest and ability of adolescents to work in the fields of social relationship and not-too-complex or didactic psychology with verve and genuine interest. Such study is a means of helping them understand and solve some of the social-relationship problems they feel. The field is unlimited in scope. The main task at hand is to find accurate measures of the psychological tools youths need, want and may be able to use. The equally important one is to find the best methods for extending suitable general learning experiences to all and specific and individual help to those whose problems have gone deep. Well directed effort in this "pays off" well and brings renewed challenge to proceed further.

MORRISON

(Continued from Page 51)

brought in for a continuing period of several months to take full charge of a specified project. The purpose

is to find the ablest person or persons in the field for the stimulation and help he will give both to the specific research and to the Department's staff as a whole.

c. Specialists in particular fields, employed as research associates or research assistants to work on specific projects in their respective fields for periods of time varying from one or two months to two or three years.

d. Research assistants, part time. These are usually graduate students selected because of special interest and ability to assist university staff members engaged as consultants by the Department for a particular program of research.

e. Temporary clerks and stenographers for the periods of peak load.

The regular staff and the continuing annually appointed staff give continuity to the research program. They keep contacts with the administrative staff and with the field. They plan for the future. They are the nucleus around which the temporary staff is built.

The temporary staff provides the special knowledge needed for each particular project. When the project is finished, that particular temporary staff is released and new specialists are engaged for the next project. Through contact with the temporary staff, the regular and continuing staff is continuously stimulated by new association with the ablest people available in their respective fields.

6. *How can the research staff avoid being submerged in the pressures that crowd on every administrative agency?*

The history of research bureaus especially in city school systems is that, sooner or later, they are so loaded with routine problems requiring immediate action that long-range research disappears.

The first requisite is that the staff assigned to research—for the period of the assignment, at least—shall be entirely freed from administrative and supervisory duties, i.e., they shall give their full time to research

and be judged by the results.

Since a considerable volume of the total demand on the research staff is of a routine nature, we have sought to protect research properly by creating the two units under the Assistant Commissioner for Research, namely, the Research Division, and the Bureau of Statistical Services. The Bureau handles requests for statistical information which come to the Department. It reviews and advises on the preparation of questionnaires sent out by the Department other than from the Research Division itself. It counsels and supervises workers from other Departmental units, and from the schools and colleges that wish to take data from the statistics reported or banked by the Department. It works with research committees of educational associations and services the Research Division on projects requiring the use of tabulating equipment.

When a special appropriation is made for a specific purpose, usually a special staff is organized for the particular job and works under the immediate supervision of the Assistant Commissioner. Illustrations are the "Institute Curriculum Research" project previously referred to and a study of the Intermediate District set up under the auspices of the Council on Rural Education. In all such cases, staff can be shifted from one project to another, and back and forth between the temporary units, the Bureau and the Division.

7. How should research be related to the remainder of the educational organization?

We have pointed out that the research staff, through the Assistant Commissioner, is responsible directly to the Commissioner and that a project is included in the research program only on the direction or with the approval of the Commissioner.

When a proposed research affects a major division of the Department's work or involves problems which later may require Regent's

action, the Commissioner keeps the Regents informed and, in some instances, obtains their approval before authorizing the research.

As a member of the Commissioner's Cabinet, the Assistant Commissioner for Research is informed of the problems confronting the Administration and, in turn, keeps the research staff informed through its executive committee. Conversely, this organization provides a channel for the flow of ideas from the staff through to the top ranks of administration.

The other phase of intra-departmental relations is the flow of ideas horizontally at all levels between the research staff and the administrative-supervisory staff.

Research has no place to operate except within a field for which some other agency has full administrative responsibility. This requires that research be useful to the responsible administrative agency without in any way or degree surrendering its own intellectual integrity.

We have enjoyed good relations with the various educational associations. In some cases we have worked closely with their committees on projects which they have initiated. In others, the associations have appointed and financed advisory committees to work with us. More frequently, the Department has named and financed its own committee, representative of various educational interests, to assist in specified studies.

What are the next steps?

Our tentative program for the next fiscal year calls for certain departures from the course developed thus far:

- a. We propose to extend the work of the Bureau of Statistical Services to include certain recurring evaluative studies to be repeated at two, three, five or ten year intervals.

Illustrations are: (1) teachers' wages related to type of district, geographic area and cost of living, (2) the holding power of high schools, to find

why more pupils remain for graduation in some schools than in others, (3) registration by subjects in high schools, with reference to trends and casual factors.

The annual statistical reports of schools and colleges provide a rich body of raw material for research, for the continuing appraisal of education.

- b. We hope to achieve a more effective coordination of educational research throughout the State.

Through the universities, colleges, public schools and educational associations, the State's present resources for educational research are substantial. Some of the proposals under consideration are an annual conference of representatives of institutions engaged in educational research, annual or semi-annual publications of research in progress and a quarterly bulletin of educational research.

- c. A third proposal is to obtain a closer coordination of educational research in the social sciences.

The studies of problems confronting boards of education and of means of preventing juvenile delinquency led unmistakably to the need for achieving in the realm of research a closer coordination of education and the social sciences—both at the local and at the state level. We hope to be useful in bringing the two lines of research into co-operative endeavor. The improvement of the school is dependent on the improvement of the community.

- d. A fourth venture involves the coordination of research and promotion in developing an explanatory-experimental program.

During the past year, the Education Department has had a lump sum appropriation of \$100,000 for an explanatory program in adult education. For the ensuing year, it is proposed to re-allocate a portion of the appropriation to research

for the purpose of determining needs and of evaluating programs that are already in existence. This involves setting up an operating staff and a research staff. They will work in close co-operation—one on promotion, the other on evaluation.

CONCLUSION

We have tried to make research a useful, respected, essential function of a great administrative department. We hope to make it a stimulating, coordinating force in improving the State's educational system.

SOPER

(Continued from Page 53)

ing a war period, the number of youth leaving school to join the Armed Forces would be high; 27 percent left for this reason. It is probable that some of these would have left anyway. The second highest reason for leaving—26 percent—was the desire to work. The high wages of industry were irresistible to a large group of high school pupils. Almost one-quarter of those who left lacked interest or incentive to stay in school. Another important reason for leaving was the inability to do school work. The study showed that thirty percent of the eighth grade pupils studied dropped out at the end of the eighth grade for this particular reason. As the progress of the group continued, this percentage decreased considerably and by the time the 11th grade was reached only three percent of the leaving pupils were unable to do the school work expected of them.

The question may properly be asked, what did these youths do who left school before graduation? As already pointed out the final check-up disclosed that 51 percent of the boys went into Military Service. Of the remainder 43 percent were employed for wages and 6 percent were at home, presumably working. It is probably that most of this group was composed of farm boys assisting with the operation of their parent's farms. Of the girls 63 per-

cent were reported employed; 34 percent were at home or married but not gainfully employed. Three percent of the girls were reported as strictly unemployed. It is not surprising but discouraging that so few of these pupils continued their formal education. Although one-fifth of the group terminated their education at the end of the 8th grade and an additional two-fifths after one or two years of high school only three percent were reported to have pursued any kind of additional study after leaving school.

Of those gainfully employed by far the largest percentage were engaged in manual or craft jobs. Other occupational groups drawing a large proportion were agriculture and the service occupations. It was interesting to note that there was a differential in wages received between those with only eighth grade schooling and those with one or more years of high school education. It was evident that youth who had not received education beyond the eighth grade were at a disadvantage in comparison with their fellow employees who had the advantage of some high school education.

Thus far we have spoken chiefly of the background of the study and the characteristics of the pupils involved, with particular emphasis upon the ones who dropped out before graduation. The title of the study leaves the impression that its purpose was to determine what adjustments could be made in rural schools to correct some of the unsatisfactory conditions known to exist. It is gratifying to report that many adjustments were already underway when the study was initiated and were continued during the progress of the study, while in other instances new adjustments were attempted. It was noted above that many of the unsatisfactory conditions were found in common school districts possessing no high school facilities. At the time the study was initiated there were in New York State 5,473 such districts and during the same year

267 central rural schools under the supervision of district superintendents. As of June 30, 1946, the number of common schools numbered 4,215, a reduction of 1,258 districts. This was accomplished largely through the organization of approximately 50 additional central rural schools. Naturally this large reduction in the number of small school districts has had its effect upon the educational opportunities provided for rural youth. The reduction is continuing at the rate of approximately 300 small districts per year.

In order to determine the nature and extent of adjustments to the needs of youth made by rural high schools during this study a check list was prepared in which were listed possible adjustments under six different categories as follows:

- (1) Adjustments for individual abilities.
- (2) Individual deficiencies.
- (3) Home deficiencies.
- (4) Over-ageness.
- (5) Vocational preparation.
- (6) General adjustments.

It was discovered that the adaptability of the secondary schools in rural New York State was affected by at least two factors—size and organization. The line of demarcation in size appears to be at about the 200 pupil registration point, schools below this size showing fewer adjustments than schools above this size. The central rural school in New York State, partly because of its average size but particularly because of its more favorable position in regard to state aid, has a larger opportunity for broadening the school curriculum than the union free school district. It was not surprising in view of this condition that central rural schools had adopted more curricular and extra curricular adjustments than the union free schools.

The most frequent adjustments were those which schools could make without additional personnel. The one adjustment ranking highest of all in this field was the offering

of a non-Regents diploma, which in New York State is a considerable concession to the pupils unable because of scholastic deficiencies, to earn a Regent's diploma. Such an adjustment alone would tend to encourage many youth to remain in school until graduation. Other adjustments were the administration of intelligence and achievement tests, the establishment of a health teaching program, the expansion of intra-mural athletics, the provision of more literature on vocational and educational opportunities, the provision of low cost or free lunches, student government and contacts with pupils who were ill for a period of time. Least frequent adjustments were those in which it was necessary to employ additional personnel such as special teachers, counsellors, psychiatrists or psychologists. These less frequent adjustments may turn out to be the most significant. They embrace evening classes to make up work, shared counseling services with one or more districts, classes for mentally and physically handicapped pupils, school courses related to local industries, the elimination of non-promotion and informal parent forums.

As a means of determining whether the adjustments had been initiated before the survey began or after it was underway the respondents were asked to indicate the date of the initiation of each adjustment. If the reports are to be taken at face value or even if somewhat discounted there is evidence that the study prompted the schools to make adjustments to meet the needs of the youth attending the schools. In general, more than two thirds of the adjustments were made after 1940, the beginning year of the study.

At the end of the check list school administrators were asked to describe two or three adjustments which had been of most value. Their replies indicated a concentration of interests in six areas:

(1) Organization of a guidance

program by a trained counsellor.

- (2) Setting up a testing program.
- (3) Improving health services.
- (4) Providing for the recreational needs of youth.
- (5) Adapting school organization and curriculum to meet the varied abilities of pupils.
- (6) Developing relationships between the school, the parents and the community.

The formal, organized phase of the study has ended. It is water over the dam. But like all functioning dams the water is still flowing. The results of the study are still developing. It is hoped that the interest generated will continue to produce better schools for rural youth.

CHAMBERS

(Continued from Page 55)

planned public transportation, the artificial distinctions between town and country that have already largely disappeared in most departments of life except education. It may be said that this result is already being accomplished to some extent by superimposing a maze of separate high-school districts and separate junior-college district upon a mosaic of scores of elementary-school districts within a given county; and it may be argued that by treaties and various forms of ingenious formal and informal cooperation among all these entities the children can get some of the benefits of a good and complete school system.

But I believe everyone knows that if the Army and Navy had used such a system as that, they would have failed in their training missions. Their training was largely accomplished in installations large enough to make practicable a concentration of ample equipment, and abundant expert personnel to provide administrative leadership, supervisory service, and competent technical service in such matters as local production and distribution of visual aids, effective curriculum revisions when required, and local

construction and administration of achievement tests in great profusion and variety. In all these matters they had, of course, the assistance and very often the direction of high echelons of command. But even in the tightly centralized national system, a great deal of the day-to-day success of a training installation depended upon local ingenuity operating amid an abundance of materials and encouragement from higher up.

At any of the intermediate headquarters, such as one of the flying training commands or one of the technical training commands of the Army Air Forces, or their opposite numbers in Naval aviation, there were assembled administrative, supervisory and technical staffs which in numbers, organization, and activity would assuredly put to shame the state education departments in many states today. I am not speaking of New York or of half a dozen other leading states; I am speaking of forty-eight states. In many of them the state education department is chronically undermanned, underpaid, and under-equipped to provide the professional leadership and technical services which ought to be available to the entire state school system from the state level of administration. The parallel with the armed services training systems is close, even from the viewpoint of authority, for legal authority and responsibility for its schools rests with the state itself, and ought not to be abdicated. The need is for a strengthened state education department heading a system of modern local districts in every state. Any state legislature has ample authority to set up such a system.

The connection between the matter of intergovernmental cooperation in education and the armed services training experience is too obvious to need to be labored. In civilian education in peacetime it is only necessary for the federal government to pay part of the bill, and it may even help call the tune

in the sense of publishing the facts and inspiring the crystallization of great nationwide purposes and goals which are no less important than were the aims of war.

COOK

(Continued from Page 57)

and interests of pupils but only their names. In college even the attempt to know names is given up.

Approaches to the Problem of Individual Differences

Educational procedures for meeting the needs of individual pupils may be grouped under two major divisions. The first is based on the assumption that instructional groups can be made relatively homogeneous with respect to general ability and then subjected to standardized assembly line educational methods of uniform textbooks, assignments, recitations and examinations. The second major approach to the problem is based on the assumption that variation within the individual with respect to types of educational capacities as well as variation between individuals are so great that homogeneity to the extent necessary for the success of traditional mass instructional procedure is impossible. The goal here is to accept each instructional group as essentially heterogeneous, each individual as unique, and to discover effective methods of meeting individual needs and capacities in such groups. We shall deal with the procedures based on the assumption of homogeneity first.

The procedures relied upon for producing homogeneous instructional groups have taken three general forms: (1) homogeneous grouping on the basis of one or more measures of general competence such as intelligence tests, general educational achievement tests, school marks and teacher opinion; (2) judicious policies of acceleration, promotion and failure; and (3) more effective teaching.

Effectiveness of General Ability Grouping

General ability grouping is based

on the hypothesis that there is relatively little variation from trait to trait within the individual, that all traits with which the school is concerned are substantially correlated, and that mental functions are organized around a predominating general factor which determines the general competence level of the individual. Evidence from several overlapping fields of investigation bear upon this hypothesis and all tend to refute it. The first is concerned with basic theories of mental organization such as those of Spearman, Thorndike, Thompson, Kelley, and Thurstone, the second, with studies of the so-called "idiots savants" such as those of Treadgold, the third with asymmetry of development in normal and gifted individuals such as those of Terman, Hollingsworth and DeVoss, the fourth with direct measures of trait variability, such as those of Hull and Paterson, the fifth with evidence of correlation between traits such as those by Burt, Gates, Paterson and others, and the sixth with the overlapping in educational achievement of groups which have been made homogeneous with respect to some measure of general ability, such as those of Hollingshead and Burr.

In summarizing this mass of research we may conclude that under the most favorable circumstances, that is, when pupils are grouped on the basis of educational age and this measure is heavily weighed in favor of reading and arithmetic scores, we may expect a reduction of about 20 per cent in the range of ability in X Y and Z groups in reading and arithmetic. Instead of a range of eight years in reading abilities at the sixth grade level, the teacher has, after grouping, a range of 6.4 years. In other subjects such as art, music, handwriting, science and mechanic arts, the reduction of range would approach zero.

The important generalization to be drawn from studies of trait variability is that no instructional

group formed by general ability grouping is sufficiently homogeneous to warrant uniform mass instructional procedures. The teachers attention must constantly be directed to individual children and their immediate problems in learning. The harm resulting from homogeneous grouping is inherent in the assumption that the group is homogeneous and that instructional materials and procedures can be adjusted to the needs of the group as a whole. The obligation of the school to furnish instructional material with a range of difficulty continuous with the range of ability in the group and to meet the needs of the individual pupil is as great when ability grouping is practiced as when it is not.

Effect of Promotion Policies on Variability of Classes

The extent to which judicious policies of promotion and acceleration will reduce the range of ability in classes and the consequent need for individual instruction has always been overemphasized. It is generally believed that the trend toward universal promotion of pupils has increased the variability of classes, lowered the average achievement of classes and reduced the incentive to achieve.

An investigation reported by Cook⁷ tests the validity of these claims. Complete test records were available for 148 Minnesota school systems. These systems were first ranked on the basis of the amount of retardation. Then nine systems that approached the universal promotion end of the scale were matched with nine systems which maintained rigorous standards of promotion. Matching was on the basis of size and socio-economic status of the school and the professional qualifications of teachers in the system.

⁷Walter W. Cook, "Some Effects of the Maintenance of High Standards of Promotion," *Elementary School Journal*, 41:430-437 (February 1941).

It was found that schools attempting to maintain high standards of promotion tend to have a higher proportion of over-age, slow learning pupils, since such pupils remain in school from one to several years longer. The high proportions of such pupils reduced significantly the mean mental age and achievement level of grade groups in these schools. Five of the eleven differences in achievement were significant at the 1 per cent level.

In comparing the variability of classes in the two groups of schools on eleven achievement tests and intelligence no significant difference was found. The higher proportion of low ability pupils in the schools with high rates of retardation tended to keep the variability of classes large. Pupils were rarely failed more than twice in the same grade and eventually reached the upper grades in spite of the efforts to maintain standards.

When the achievement of pupils with the same chronological and mental ages in the two groups of schools were compared, no significant differences were found. This would tend to indicate that the schools were well watched and that the constant threat of failure did not increase achievement. It also emphasizes the fact that it is the retention of a large number of low ability pupils through non-promotion that reduces grade standards and aggravates the range of ability problem.

Effective Teaching and Class Variability

The idea is quite common that instructional groups can be made more homogeneous in a given achievement area through effective teaching. It keeps company with other ideas inherent in the traditional conception of the schooling process. Education is conceived to consist of learning such things as are found in courses of study and text books: spelling words, type problems in arithmetic, causes and

results of wars, states and their capitals, explorers and where they explored, names and dates, cities and their characteristics, countries and their products, rules for punctuation and capitalization, and the seven basic food groups. Good teaching consists of threatening, coaxing, drilling, driving, testing, and reviewing until the pupils know these facts. Providing for individual differences means getting all pupils over the passing mark with at least 75 per cent complete knowledge. What harm is there in this simple conception of the schooling process?

The problem with which we are dealing is basically concerned with the effect of a period of learning upon individual differences. Are individuals more alike or less alike with respect to a given ability after a period of instruction? A considerable amount of research on this question is available and has been summarized by Anastasi⁸, Peterson and Barlow⁹, and Reed¹⁰. The research is somewhat contradictory and many technical problems are involved in its interpretation, but for our purposes the following generalization is warranted. If the responses to be learned are sufficiently simple and the goals that have been set so limited that a high proportion of the group can master them during the period of learning, the

⁸A. Anastasi, "Practice and Variability: A Study of Psychological Methods," *Psychological Monographs*, 45: 1-55 (1934).

⁹J. Peterson and M. C. Barlow, "The Effects of Practice on Individual Differences," *Nature and Nurture: Their Influence Upon Achievement*. Chapter XIV (Twenty-Seventh Yearbook of the National Society for the Study of Education) Part II, 1928 Pages 211-230.

¹⁰H. B. Reed, "The Influence of Training on Changes in Variability in Achievement," *Psychological Monographs*, 41: 1-59 (1931).

variability of the group becomes less; but if the task is complex and the goals unlimited so that the abilities of the most apt members of the group are taxed during the period of learning, then the variability of the group increases.

The most serious result of the type of schooling procedure which attempts to set goals sufficiently limited to result in relative homogeneity of achievement is that what is learned is of little value and is retained for only a short period. We may identify the unlimited goals of education, the complex learning, those which involve the operation of the higher mental processes as the true and ultimate objectives of education, and as the permanent learnings. These are also the learnings in which the more effective the instruction the greater the variability in achievement. They consist of such learnings as the following: (1) ability to use an extensive vocabulary, (2) power of comprehension of natural science, social science and literary materials, (3) problem solving ability in mathematics and the sciences, (4) ability in written and oral communication, and (5) the ability to plan and work with others.

The term "limited goals" as used here implies lists of facts, principles and type problems which may be memorized in a rote sense for examination purposes to give a semblance of uniformity of achievement in meeting the requirements of a passing mark. Early objective achievement tests tended to emphasize this type of learning. Tests of retention given from three months to three years after a course was completed revealed from 60 to 80 per cent of the information required by the final examination was lost. Buckingham¹¹ called it the greatest waste in education. The forgetting curves closely approximated those for non-sense materials.

¹¹B. R. Buckingham, *The Greatest Waste in Education, School and Society*, 24: 653-58. (1926).

Tyler¹² demonstrated the low relationship between achievement tests measuring mere recall of information and those requiring the application of principles and the drawing of inferences, in courses where emphasis was on the measuring of facts, Johnson¹³ and McConnell¹⁴ demonstrated that in courses where emphasis was on application and problem solving the relationship was higher. Tyler¹⁵, Wert¹⁷ and others have demonstrated that, although deterioration is the rule when factual tests are repeated from one to three years after a course is completed; when tests of the application of principles to new situations and of interpretation of new experimental data are repeated there is frequently considerable gain. That is, the problem solving and application abilities are relatively permanent learnings.

The position may be taken that problems solving ability depends upon intelligence and since intelligence is inherited and constant, there is little the teacher can do about it. The studies by Tyler and Wert demonstrate that application abilities were developed during in-

struction and once developed were relatively permanent. A sounder educational point of view would be that an intelligence test simply samples a wide range of permanent learnings and although, in general, it indicates capacity for this type of learning, the level attained by an individual in any area depends to a high degree upon the type of instruction he has experienced.

It would seem then that the emphasis which the traditional schooling process places on striving for homogeneity in classes, getting students over the passing mark, and providing for individual differences with a view to bringing all pupils up to standard, encourages teachers to set goals for instruction which result in temporary factual learning involving only the lower mental processes.

Meeting the Educational Needs of Individuals in Heterogeneous Groups

During the period of common school attendance physical development is perhaps the most important single factor in determining status in a group. It is the basis upon which children feel they belong or do not belong to a group both in and out of school. It is a period of rapid maturation and the most obvious characteristic is size. During this period the first basis for grouping children for educational purposes should be general physical and social development. Since chronological age is not perfectly related to development some adjustments will have to be made at the primary level. However, the all important factors in the basic grouping of pupils should be physical and social development. A child should live and work in the group he most obviously belongs with, one which accepts him and which he accepts.

All assumptions that a grade level indicates anything regarding intellectual competence or educational achievement must be given up. Evidence has been presented indicating that grade level has never truly signified these things, but the as-

sumption that it has has led to absurd practices and thwarted attempts to meet individual needs. The determination of intellectual competence and educational achievement must rest primarily upon measurement. Teacher observation and judgment will always be important in the immediate learning situation and in the appraisal of those traits not measurable. But measurement will carry the burden of information on educational status. Diplomas will be given by virtue of years attended, and courses taken but they will be assumed to carry no further meaning. The practice of granting diplomas on the basis of credits earned by examination should be discontinued since it confuses the "time spent" rewards of education with educational competences. The student, the teacher, the administrator and the employer must learn to think of individual competencies in objective terms. The machinery of the school must be focused on the development of these competencies with less attention to curriculum hurdles and course sequences leading to diplomas and degrees.

If individual differences are to be provided for in heterogeneous groups certain administrative and curriculum changes must be made in the common schools.

Desirable Administrative Changes

The administrative changes have two purposes: (1) to make it possible for the teacher to know the pupil well enough to meet his needs, and (2) to provide instructional material with a range of difficulty commensurate with the range of ability in the instructional group.

To list a few of the desirable administrative changes:

(1) The size of classes must be reduced to not more than 25 pupils in the primary grades nor more than 30 above this level.

(2) A systematic testing program revealing status and growth in the skills, abilities, and attitudes required for optimum adjustment in the culture must be instituted.

¹²R. W. Tyler, "The Relation Between Recall and Higher Mental Processes" in C. H. Judd, *Education as Cultivation of the Higher Mental Processes*. MacMillan, New York, 1936, pages 6-17.

¹³P. O. Johnson, "Differential Functions of Examinations", *Studies in College Examinations*, Minneapolis, University Committee on Education Research, University of Minnesota, 1934.

¹⁴T. R. McConnell, "A Study of the Extent of Measurement of Differential Objectives of Instruction", *Journal of Educational Research*, 33: 662-670, (May, 1940).

¹⁵R. W. Tyler, "Permanence of Learning", *Journal of Higher Education*, 4: 203-204, 1933.

¹⁷J. E. Wert, "Twin Examination Assumptions," *Journal of Higher Education*, 8: 136-140, 1937.

These begin with relatively undifferentiated tests at the pre-school level and reach a high degree of differentiation at the high school level.

(3) There must be grouping within classes on the basis of status and needs in specific learning areas. These groups are to be flexible in organization and highly specific in purpose.

(4) At the high school level there should be special classes for students who demonstrate unusual ability in the sciences, mathematics, or language.

(5) In the elementary school the practice of having a teacher remain with the same group of pupils from 3 to 6 years should be encouraged.

(6) In the high school the practice of integrating English and the social studies during a half day in a laboratory workshop should be encouraged. Trained counselors must be made responsible for the guidance of a limited number of pupils over a period of years.

(7) The practice of reporting to parents on cards or by letters should be abandoned in favor of personal conferences two or more times each year.

(8) A wealth of instructional material must be provided. It should have a range of difficulty, interest appeal, and content commensurate with the range of abilities and interests of the class.

(9) The traditional inflexible daily program at both the elementary and high school level must be modified in terms of the requirements of the modern curriculum.

Desirable Curriculum Changes

It is obvious that if in the elementary school all pupils are required to read the same books, do the same exercises, solve the same problems, pass the same examinations there can be but slight recognition of individual interests and abilities. Likewise in the high school, if curriculum requirements are rigid, if all pupils are required to take certain subjects, or a certain sequence of courses in a given

curriculum, recognition of individual needs is thwarted. This is true whether the requirements are imposed by the state, school standardizing agencies or the local school administration.

Whenever a school purports to accept all the children of all the people it must strive for a curriculum sufficiently broadened to recognize and reward the great variety of combinations of aptitudes and interests of pupils, preparing them to fit into our complex society with its multiplicity of demands. The curriculum must be modified to provide flexibility of requirements. The teachers and counselors must be free to plan for the welfare and optimum development of individual pupils.

To list a few of the desirable curriculum changes:

(1) The curriculum content should be organized around broad units of work which center attention on significant aspects of the social and physical environment.

(2) It must be recognized that the grade levels at which certain knowledge, skills, and abilities should be learned cannot be determined with any degree of specificity. Certainly these itemized curriculum elements cannot be learned in a one, two, three fashion; once and for all time; out of their functional setting and natural context. And certainly the curriculum cannot be organized around these itemized goals.

(3) Pupils should share the responsibility for setting the educational goals toward which they strive.

(4) Since life outside of school recognizes and rewards a great variety of aptitudes and combinations of aptitudes, the school should do the same. The traditional school has too often recognized and rewarded only docility and a facile memory. The broadening of the elementary and high school curriculum to include various forms of practical arts, fine arts, a school paper, athletics, extended educational

field trips, participation in community affairs, stimulation of hobbies, participation in school government, the safety patrol, radio programs, work experience, and community health programs is evidence of the acceptance of this principle. The common school should be a proving ground in which the individual discovers his peculiar strengths and weaknesses. If every child is to find himself, the school's opportunities for development must be as broad as the demands of the culture.

ORLEANS

(Continued from Page 59)

$2ab + b^2$ or that $(x+y)^2 = x^2 + 2xy + y^2$ depending on which the student learned as the model.

- (4) If a factor occurs in each of two (or more) terms of an expression, as in $5(d+3) - 2m(d+3)$, it is a factor of the expression two (or more) times. The factors of the expression are therefore $(5-2m)(d+3)^2$ or $2(5-2m)(d+3)$.
- (5) Change all the signs of an expression if the sign of the first term is minus. An expression like $-c+1$ can be written $c-1$. This is true because multiplying an expression by -1 does not change its value. This is true when you multiply both sides of an equation by -1 , therefore it must hold true for either side along.
- (6) In simplifying an expression that has two exponents, like $(x^2)^3$, the exponents may be added, multiplied, subtracted, or divided, or one may be used as the power of the other. Therefore this expression may equal x^5 , x^7 , x , x^{-1} , x^8 , or x^9 , and you may choose whichever you wish.
- (7) If both numerator and denominator of a fraction are perfect squares, the fraction equals the square root of itself. Thus $16/25$ equals $4/5$.

Or, a fraction may be reduced by taking the square root of both numerator and denominator. This rule probably derives from the fact that the value of an equation is not changed when the square root of both sides is taken, or from the fact that the value of a fraction is not changed if both numerator and denominator are divided by the same number. After all what works when you divide should work when you take the square root!

Some of these "student's algebra" rules, and many others, do not occur very frequently. But their total frequency of occurrence for all students who engage in them, or in various ones of them, is just that much more evidence supporting the conclusion that the "learning" of algebra is devoid of meaning for many of the students.

The analysis makes only too clear that few, if any, of the students evaluate their answers. And certainly a large percentage are blissfully unaware of the fact that there must be some relationship between the original task and the answer. Many more would seem to be equally blissfully ignorant of the fact that the answer is supposed to have some kind of meaning. Illustrations of these last two points are (1) the squaring of a binomial, e.g. $(2a-3c)^2=4a^2-9c^2$ which the student then factors, although the task does not call for that, into $(2a+3c)(2a-3c)$; and (2) finding $\sqrt{64+36}$ as $8+6$ without realizing that that means that the square root of 100 is 14.

Every year hundreds of thousands of students enroll in high school courses in algebra, elementary and intermediate, presumably to have their minds trained, to learn how to reason, to learn to evaluate responses, to learn to use algebraic techniques in order to solve problems, to learn to be systematic and neat in their thinking and their

written work, and the like. Of course, an inspection of courses of study and textbooks reveals that despite such high flown statements of purpose, the actual purpose of the typical algebra course is unadulterated mastery of skills and techniques. With what results? If the results disclosed by the analysis referred to are so meagre for a very superior group, what profit has been derived by the general population of high school students of the subject? What educational purposes have been served? What educational gains have been achieved? It should be borne in mind, incidentally, that the study does not deal with the solution of problems, in which area the results are appreciably worse than in the skill aspects of the subject. It is not correct to say that students are not taught to reason in solving algebraic problems. A more accurate statement is that they are taught not to reason. Just as the formula is employed as a substitute for meaning in the use of skills, so a form of maze learning is substituted for reasoning in the solving of problems.

The implication of all these findings is *not* that high school students should not learn mathematics. Mathematical content is too important in our lives for the learning of it to be dismissed too readily. The implication is rather that for most pupils, perhaps all in the ninth and tenth grades, there should be no learning of academic mathematics. There is need for a specification of educational purposes that call for the learning of content in the area that we call mathematics, the selection of appropriate content that will produce this learning, its arrangement and treatment in a manner that will result in maximal facility of learning. But in any event the learning must be purposeful and meaningful. We have no right to expect the high school students to understand the generalized techniques which are the result of centuries of intellectual development,

without at the same time having any notion of the values of the techniques or the purposes that they are to serve. The high school student should be led to appreciate the significance of mathematics in our civilization, how mathematical techniques are developed, the nature and value of mathematical reasoning, and similar worth while goals, *not* as piously hoped for incidental outcomes of academic study that leads to blind mastery of skills, but through experiences aimed directly at these desired outcomes, experiences that have purpose and meaning for the learner.

It may be argued that the study discussed in this paper is destructive. The writer reached the point of view some years ago that our educational inertia is so great that only a pretty thorough destruction of the archaic practices that are producing our present educational bankruptcy will stimulate educational personnel as well as laymen to action. There can be little doubt that these findings in the field of algebra can be readily duplicated in the learning of foreign language, academic science, academic social studies, or of any of the other academic subjects. In short the answer is not that the methods of teaching high school mathematics need to be improved, but that our entire secondary school program needs overhauling.

A small community faced the need for a new jail. Hampered by budgetary limitations, the town council settled the matter by passing a resolution that (1) the old continue to be used until the new jail was completed, and (2) that the bricks and other materials out of which the old jail was constructed be used to build the new jail. Education in this country will continue to find itself in the same predicament until we are ready to build a new educational program for life in our modern world, instead of continuing to use the educational philosophy and materials of the past.

From The Research Department

Study of Official Withdrawals at I. S. T. C.

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Each term a number of students enroll in college who withdraw from school before the term ends, and in many cases, within only a few weeks after enrollment. Why should so many students enroll in college with full intentions of completing at least one term, yet withdraw within so short a time? The purpose of this study was to determine a partial answer to this question, particularly with reference to "official withdrawals."

By official withdrawal is meant that the student withdrawing from school obtains a signed release by his instructor from each class in which he is enrolled, and that the Dean of Men or Women and the Office of the Registrar are aware of the withdrawal. Thereby, a withdrawal entry can be made on the permanent records. The official withdrawal is distinguished from the unofficial withdrawal in that in the latter case the individual simply drops out of school without any notification to the parties concerned and no reason is obtained for the withdrawal.

In the process of official withdrawal from Indiana State Teachers College, the student is required to indicate the reason for his withdrawal on the Withdrawal Card. The weakness of this procedure is that the reasons for withdrawal are listed on the card, and are of such nature that one can be relied upon to cover-up another. Reason 5, for example, "To Look After Personal Business Affairs" could well be used to cover-up for reason 2, "Lack of Funds," the actual cause of withdrawal. For this reason the validity of the study might not be as high as otherwise revealed.

In this investigation, the principal aim was to ascertain the relative frequency of stated reasons for

official withdrawals from Indiana State Teachers College.

The period covered in this study was from the Winter Quarter of 1942 to the Spring Quarter of 1947. Data were obtained from the Official Withdrawal Cards which are kept in the Office of the Registrar. The entire period was divided into three parts in order to present more significant findings and to see if there have been any noticeable variations. The first period, Winter Quarter, 1942, to Spring Quarter of 1943, was the period following the declaration of war until the beginning of the Naval College. The second period, July Naval Term, 1943, to the July Naval Term, 1945, was the period in which the Naval program was in operation at Indiana State. The third period, Fall Quarter 1945, to Spring Quarter, 1947, was the period following the end of the war.

The following table shows the frequency and percentage of withdrawals for various reasons for the three periods and for the entire period.

Conclusions as revealed by the

table are:

1. During the war period, as might be expected, the entrance of students into the armed forces was the major cause of official withdrawals.

2. Leaving college during the term to accept positions has constantly been an important cause of withdrawals.

3. Withdrawals due to poor health have increased steadily, and nearly 14 per cent of all withdrawals for the entire period were due to ill health.

4. There have been no official withdrawals during the entire period because of disciplinary problems.

5. Lack of adequate finance and marriage have played a rather insignificant part in official withdrawals.

6. Official withdrawals have been quite significant during the five year period covered in the study as can be seen in the total number of official withdrawals. There have been nearly 1200 official withdrawals from Indiana State during this time.

TABLE I
FREQUENCY AND PERCENTAGES OF OFFICIAL WITHDRAWALS

Reason for withdrawal	Winter 1942 Spring 1943		July Naval 1943- July Naval 1945		Fall 1945- Spring 1947		Totals	
	No.	%	No.	%	No.	%	No.	%
Armed forces	236	48.0	62	23.0	20	4.6	318	26.6
Lack of funds	9	1.8	2	0.7	12	2.8	23	1.9
Poor health	30	6.1	48	17.8	87	20.0	165	13.8
To accept position	123	25.0	32	11.9	78	18.0	233	19.5
Look after personal business	18	3.7	25	9.3	74	17.1	117	9.8
Transfer to other institution	15	3.0	21	7.8	45	10.4	81	6.8
Discipline	0	0.0	0	0.0	0	0.0	0	0.0
Marriage	5	1.0	9	3.3	4	0.9	18	1.5
Death or sickness in family	14	2.8	9	3.3	33	7.6	56	4.7
Called home by parents	0	0.0	2	0.7	3	0.7	5	0.4
Advised to withdraw	0	0.0	0	0.0	0	0.0	0	0.0
Late entrance	4	0.8	1	0.4	0	0.0	5	0.4
Other reasons	17	3.5	15	5.6	24	5.5	56	4.7
Reason not stated	21	4.3	44	16.3	54	12.4	119	9.9
Totals	492	100.0%	270	100.1%	434	100.0%	1196	100.0%

